

REMARKS

A. Status of the Claims

Claims 1-4 are currently pending. Claim 1 has been amended. Support for the amendment is found in the Specification, for instance at page 3, lines 12-21 and page 4, lines 14-21. No new matter is added.

B. Rejection Under 35 U.S.C. § 103(a)

(1) Claims 1-4 are rejected under 35 U.S.C. § 103(a) as obvious over Kulkarni *et al.* (U.S. Patent No. 6,365,407) in view of Packer *et al.* (*Free Rad. Biol. Med.*, 19:227-250, 1995). In particular, it is asserted that Kulkarni *et al.* disclose a method for culturing cells of a Himalayan Yew including a medium containing an antioxidant and that Packer *et al.* disclose lipoic acid as a biological antioxidant. Applicants respectfully traverse for at least the reasons described below.

The cited references, either in combination or alone, fail to teach or suggest the claimed subject matter. For instance, claim 1 currently recites:

A method for introducing a nucleic acid sequence into the genome of a plant cell and regenerating a transformed plant therefrom, said method comprising:

- a) transforming a plant cell; and
- b) regenerating a transformed plant therefrom, wherein the transforming and/or regenerating comprises culturing said plant cell on at least one plant transformation media, said at least one plant transformation media comprising an amount of lipoic acid or an analog thereof effective for increasing the efficiency of the transformation and/or regeneration of a plant therefrom.

However, neither Kulkarni *et al.* nor Packer *et al.* disclose ***transforming a plant cell and regenerating a plant therefrom***, wherein the transforming and/or regenerating comprises

culturing the plant cell on at least one plant transformation media comprising lipoic acid, as required by claim 1.

In particular, Kulkarni *et al.* relate generally to culturing a Himalayan Yew cell in media comprising “a number of antioxidants” to promote taxane production and Packer *et al.* relate to the use of lipoic acid as a biological antioxidant in *mammalian species*. However, one of skill in the art would have no expectation of any benefit or success with respect *to transforming a plant cell and/or regenerating a plant therefrom* on at least one plant transformation media comprising lipoic acid in view of the combination of these references.

This is demonstrated by the unexpected results yielded by the claimed invention, including an increase in shoot production and transformation efficiency, for example, a 2.7-4.3 fold increase in the percentage of transgenic plants produced per explant, an increase in transient expression of a heterologously introduced marker gene, and a decrease in tissue browning when lipoic acid was used in transformation media (*see* working Examples 1-5 and Tables 1-3, 7 and 9-13).

The foregoing demonstrates the non-obviousness of the claimed invention. Withdrawal of the rejection is therefore respectfully requested.

(2) Claims 1-4 are rejected under 35 U.S.C. § 103(a) as obvious over Benson *et al.* (*Phyton*, 37(3):31-38, 1997) in view of Packer *et al.* (*Free Rad. Biol. Med.*, 19:227-250, 1995). In particular, it is asserted that Benson *et al.* disclose a method comprising culturing a plant cell on a media, and that plant cell culture is affected by free radicals and that Packer *et al.* disclose lipoic acid as a biological antioxidant. Applicants respectfully traverse.

The cited references, either in combination or alone, fail to teach or suggest the claimed subject matter. For instance, claim 1 currently recites:

A method for introducing a nucleic acid sequence into the genome of a plant cell and regenerating a transformed plant therefrom, said method comprising:

- a) transforming a plant cell; and
- b) regenerating a transformed plant therefrom, wherein the transforming and/or regenerating comprises culturing said plant cell on at least one plant transformation media, said at least one plant transformation media comprising an amount of lipoic acid or an analog thereof effective for increasing the efficiency of the transformation and/or regeneration of a plant therefrom.

However, neither Benson *et al.* nor Packer *et al.* disclose ***transforming a plant cell and regenerating a plant therefrom***, wherein the transforming and/or regenerating comprises culturing the plant cell on at least one plant transformation media comprising lipoic acid, as required by claim 1.

As described above, Packer *et al.* do not disclose transformation or regeneration of plant cells, but instead generally relate to culturing ***mammalian cells***. Similarly, Benson *et al.* provide no disclosure of transformation or regeneration of plant cells, but instead generally relate to the use of antioxidants in culture media. In particular, although Benson *et al.* is asserted to disclose that plant cells are negatively affected by free radicals, the reference actually indicates that free radicals may play a positive role in *in vitro* development and states that “at present there exists no direct evidence to implicate free radicals, activated oxygen species and/or their reaction products as causal agents in either genetic or epigenetic instability in plant cultures.” (Benson *et al.*, page 35). The combination of references therefore provides no expectation of any benefit with respect to transforming a plant cell and regenerating a plant therefrom on at least one plant

transformation media comprising lipoic acid. In fact, Benson *et al.* disclose that free radicals may have a beneficial impact on cell cultures and thus teaches away from the claimed invention.

Furthermore, the invention yields surprising and unexpected results as described above. Such unexpected results include the disclosed increase in shoot production and transformation efficiency, an increase in transient expression of a heterologously introduced marker gene, and a decrease in tissue browning when lipoic acid was used in transformation media (*see* working Examples 1-5 and Tables 1-3, 7 and 9-13).

These results, in combination with the failure of the references, either in combination or alone, to teach or suggest the claimed subject matter and the disclosure in Benson *et al.* teaching away from transforming and/or regenerating plant cells in transformation media comprising antioxidants, clearly demonstrate the non-obviousness of the claimed invention. Withdrawal of the rejection is therefore respectfully requested.

C. Conclusion

In light of the foregoing, applicants submit that all claims are in condition for allowance, and an early indication to that effect is earnestly solicited. The examiner is invited to contact the undersigned at (214) 259-0931 with any questions, comments or suggestions relating to the referenced patent application.

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Respectfully submitted,

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